Littoral Combat Ship (LCS) Mission Modules

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PEO LMW

Vision

- **One or more LCS Platforms integrated into and supporting the Carrier Strike Group or Expeditionary Strike Group**
- **Each LCS controlling a number of Unmanned Vehicles tailored to specific mission at hand…ASW, ASUW, MIW, or Inherent**
  - **Unmanned Vehicles deploying/monitoring sensors … Analyzing data or acting as data link to LCS**
- **Rapidly reconfigurable LCS platforms to meet changing scenarios via these Enablers:**
  - **Common Launch & Recovery Systems**
  - **Common Control Systems**
  - **Common Technical Architectures**
- **All Sensors, Weapons, Datalinks, Information Networks, and Platforms operating as part of a distributed network system i.e.**

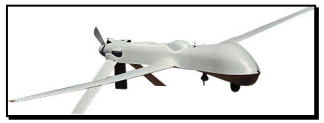
Capability Gaps

The Four “Gets” of LCS Mission Modules to fill the existing Capability G

Get Autonomous

- Put Sensors/Weapons in Dangerous Environments Without Risking Lives

- **Get Standardized**
  - Common Launch and Recovery
  - Common C2 System



- **Get Many**
  - Increased Coverage against a Multi-Axis Threa

- **Get Joint**
  - Fluid Generation and Transfer of Information throughout the Joint/Combined Force

Near Term Methodology for FLT 0

- **Look at POR / Technologies**
  - **When Is Production Unit, LRIP Unit or EMD Available**
  - **Has System or Technology Been Demo'd ?… Can It Be Demo'd ISO LCS Schedule?**
  - **Is It Feasible?**
- **Weigh Capability To Meet Mission**
  - **Look at Mission Overlap**
- **Estimate Cost**

LCS Flight 0

- **Schedule Is a Challenge**
  - **First hull in the Water 2nd QTR FY 07**
- **Maximum Use of Programs of Record and/or Mature Technologies**
  - **POR plus additional Non-Recurring Engineering Funds for Flt 0 Mission Module**
  - **Prototypes, EMD, or LRIP unit must be utilized**

Examples of MIW MM Candidates

Variant	Equipment	Capability
High	RMS, LMRS, AQS-20, AMNS, ALMDS, RAMICS, OASIS	Full MIW (Shallow Water to Deep)
Medium	RMS, AQS-20, AMNS, ALMDS, RAMICS, OASIS, SPARTAN (MIW), VTUAV w/COBRA, EOD Detachment	Full MIW (Shallow Water to Deep, Beach
Low	RMS, AQS-20, AMNS, ALMDS, EOD Detachment	Limited MIW w/ Slow Neutralization

Illustrative Only… Many other variants have been analyzed

MIW Mission Module (Medium)

Shallow Water to Deep Capability

EQUIPMENT:

1- 11 M RHIB USV

2- AN/WLD-1 (RMS)

1- MH-60S

- **2 ALMDS**
- **2 AMNS**
- **2 AQS-20A**
- **2 OASIS**
- **2 RAMICS**

3- VTUAV

- **2 COBRA**

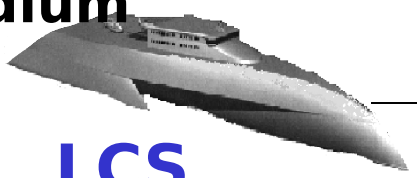
1- BPAUV

1- EOD Detachment

3- SCULPIN

- **LCS Requirement is 1 MH60S**
- **BPAUV and Sculpin for Reconnaissance**
- **RMS provides volume minehunting**
- **MH-60S with ALMDS & RAMICS provides near surface hunting/neutralization**
- **11 M RHIB to Provide Sweep Capability**
- **VTUAV with Cobra for Surf Zone/Beach**

MIW Mission Module-Medium



LCS

AMCM

RMS

UUVs

ISR

Clearance Area Coverage Rate (ACR) per LCS (nm²/day)

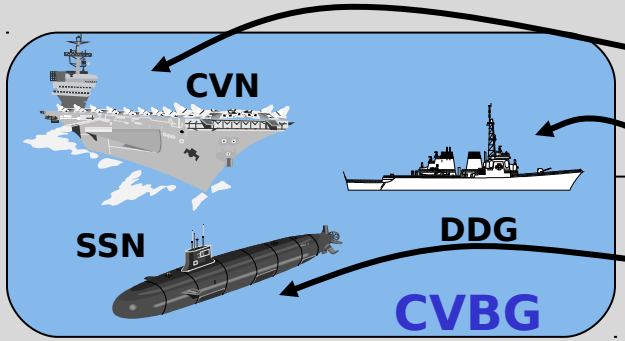
	Hunt(1)	Sweep
Near Surface	15	
Volume	10	4(2)
Bottom		
Buried		

12

Mine Threat Spectrum (water depth > 40 ft)

(1) Preferred Approach is Minehunting
(2) Sweep in Unhuntable Conditions and/or to Clear Buried Mines

Organic MCM Assets



ISR

Clearance Area Coverage Rate (ACR) per CVBG (nm²/day)

	Hunt(1)	Sweep
Near Surface	30	
Volume	5	2(2)
Bottom		
Buried		

35

(1) Preferred Approach is Minehunting
(2) Sweep in Unhuntable Conditions and/or to Clear Buried Mines

Next Generation Systems

Dedicated MCM Assets

	Hunt(1)	Sweep	Hunt(1)	Sweep	Hunt(1)	Sweep
Near Surface	2	3(3)	2			8(3)
Volume	2	30(2)	2		4	16(2)
Bottom						
Buried						

(1) Preferred Approach is Minehunting
(2) Sweep in Unhuntable Conditions and/or to Clear Buried Mines
(3) Requires Additional Platform for Neutralization

Clearance Area Coverage Rate (ACR) per Asset (nm²/day)

ASW Mission Module

ASW EQUIPMENT

1- 11m RHIB w/ Bistatic ASW Pkg

2- RMV w/ Bistatic ASW Pkg

1- MH-60R w/

- **Torpedoes**
- **Dipping SONAR**
- **Sonobuoys**

1- Torpedo Countermeasures System

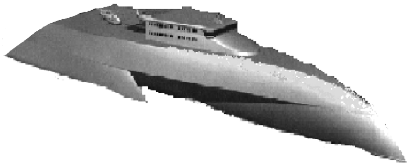
1- Advanced Deployable System (Set)

1- Periscope Detection System

1- VTUAV (Set of 3)

- **Takes Advantage of Standard**
- **Vehicles**
  - **Stable RMS Vehicle with active/ passive sensors**
  - **Fast 11 meter RHIB deploying sensors using "Sprint&Drift" tactic**
- **Advanced Deployable System for cueing in area or as barrier**
- **Active Capable Expendable System (ACES) for "large" area detection/ localization**
- **MH-60R for**

Littoral ASW Against the Diesel Threat



LCS

Shallow Water Detect/Classify	Engage	Crew Vulnerability	Persistence

Puts IUSS and Sonar Systems Near the Target , Not the Crew

IUSS

Current ASW Assets

Shallow Water Detect/Classify	Engage	Crew Vulnerability	Persistence

ASUW Mission Module

ASUW EQUIPMENT

2- 11m RHIB w/ EO/IR, GAU-7 Gun, and Missile Package

1- MH-60R w/

- **EO/IR**
- **Gun**
- **Rocket/Missile**

1- VTUAV (Set of 3) w/ EO/IR, Rocket/Missile Set

1- Netfires Missile System

2- Intermediate Gun Module

2- Non-Lethal Weapon

- **Multiple Vehicles for engagement of armed smallcraft away from LCS**
- **Large Payload RHIB Options**
  - **Netfires Precision Munition**
  - **Hellfire/Javelin-like Missile**
  - **Small Caliber Gun**
- **VTUAV and MH-60 for ISR and Engagement**

LCS Will …

- **Provide a *Persistent* and *Survivable* employment platform**
- **Provide Distributed, Networked Sensors & Weapons**
- **Fill Warfighting gaps in Littoral Mine, Surface, & Anti Submarine Warfare**
- **Provide the 4 “Gets”**

Littoral Combat Ship (LCS) Mission Modules

Back-Up

Variant Examples

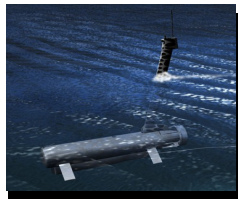
Variant	Equipment	Capability
A1	RMS, ALMDS, AMNS, AQS-20, EOD Detachment	Limited MIW (Shallow Water to Deep) Low Neutralization
A2	RMS, ALMDS, AMNS, AQS-20, OASIS, RAMICS, LMRS	Full MIW (Shallow Water to Deep)
A3	RMS, ALMDS, AMNS, AQS-20, OASIS, EOD Detachment	Deliberate MIW (Shallow Water to Deep)
A4	RMS, ALMDS, LMRS	Limited MIW (Shallow Water to Deep) Detect & Locate
A5	ALMDS, OASIS, RAMICS, 11m RHIB, BPAUV, REMUS, COBRA, EOD Detachment	MIW (VSW to Surf Zone)

Get Autonomous

- **Send Sensors and Weapons into dangerous environments without risking Lives**
- **Achieve missions that are difficult and dangerous for large ships and manned platforms to accomplish**
- **Extend off-platform reach with systems that never tire and can endure long on-station times**
- **Operate unmanned systems with various levels of control tailored to specific mission. For Example:**
  - **Search or Reconnaissance – Operate safely in**

Autonomous Systems

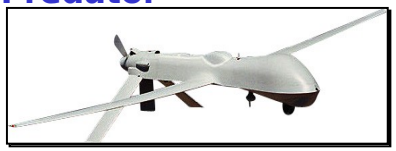
RMS



Firescout

SPARTAN

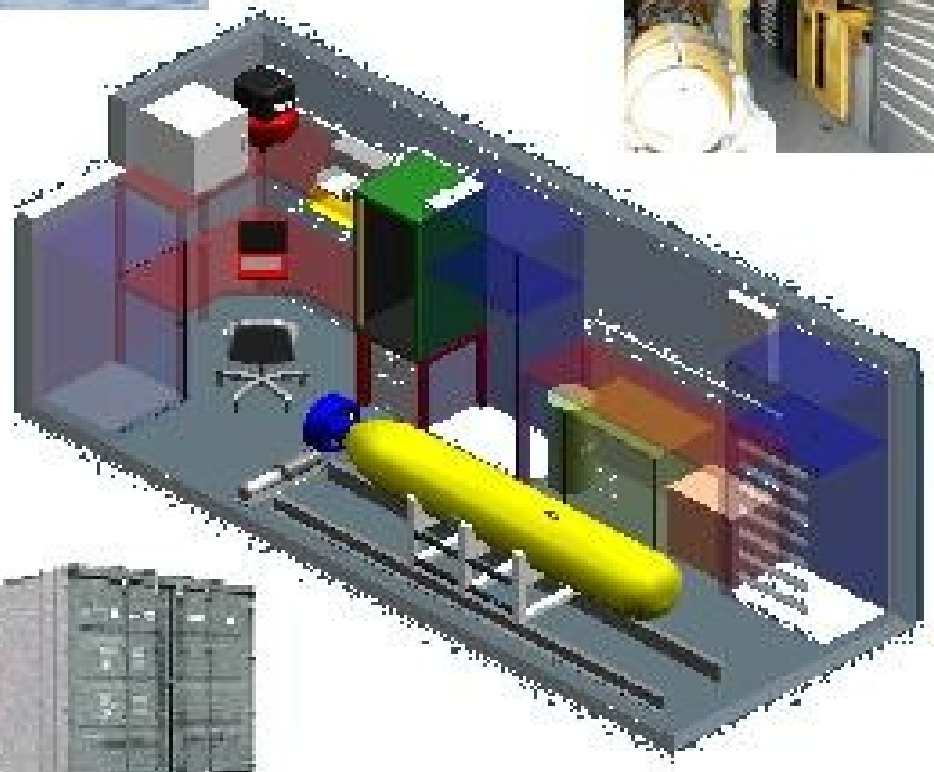
Predator



Large Displacement UUV

Get Standardized….Where it Makes Sense!

Battlespace Preparation Autonomous Unmanned Vehicle (BP-AUV): Mission Packages



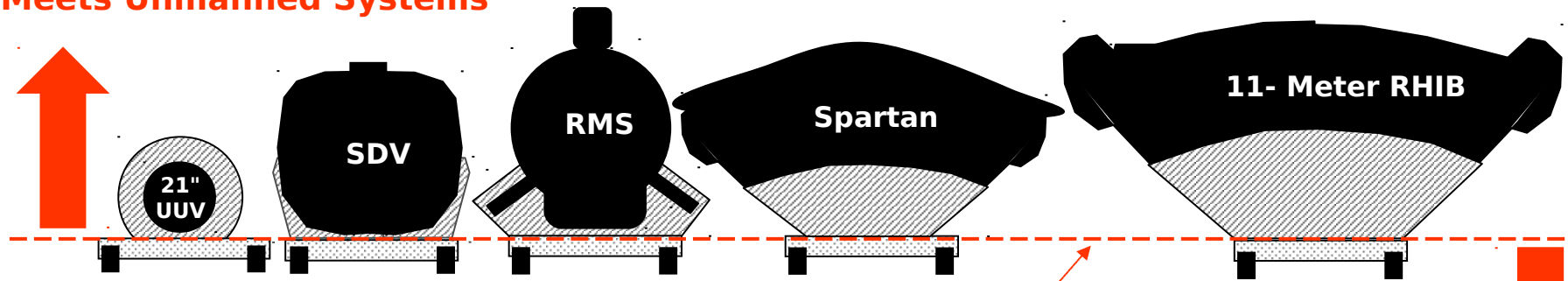
Mission Packages will be Deployed with HSV-X2 in September 2003.

Get Standardized
Common Systems Cradle

Decouples Platform from Unmanned Systems via Physical Interface Specifications

- **Launch & Recovery Cradle/Cocoon Design Developed by Specific Unmanned Systems Develope**
- **Must Meet Interface Specification Indicated by Red Dashed Line**
- **<u>Decoupled from Platform Design</u> and Launch & Recovery Ramp/Deck Handling - Just Meet Interface Specification**

Meets Unmanned Systems



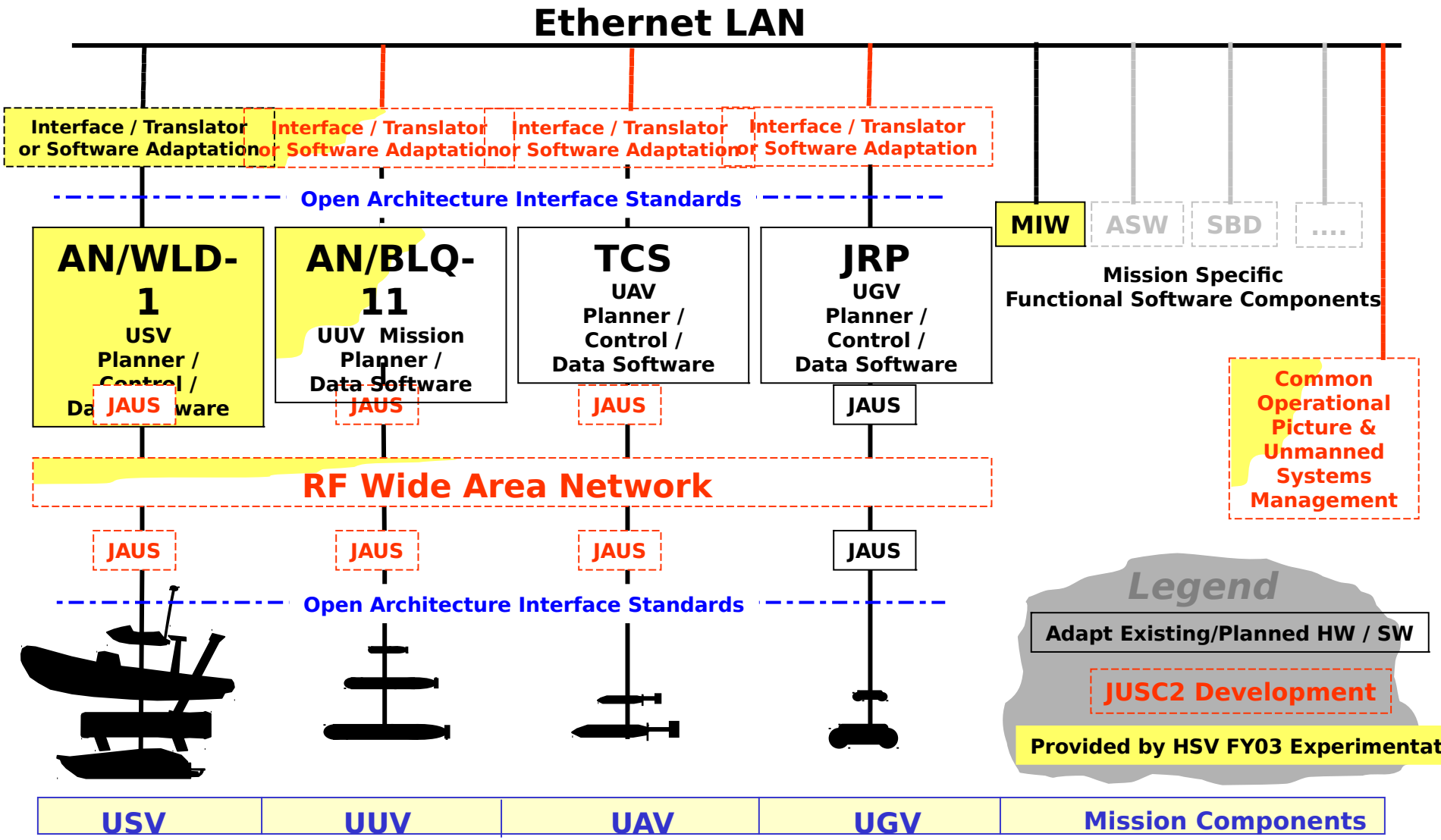
L&R Cradle Interface Specification

Vehicles "Live" in Cradle/Dolly Assembly Onboard Ship

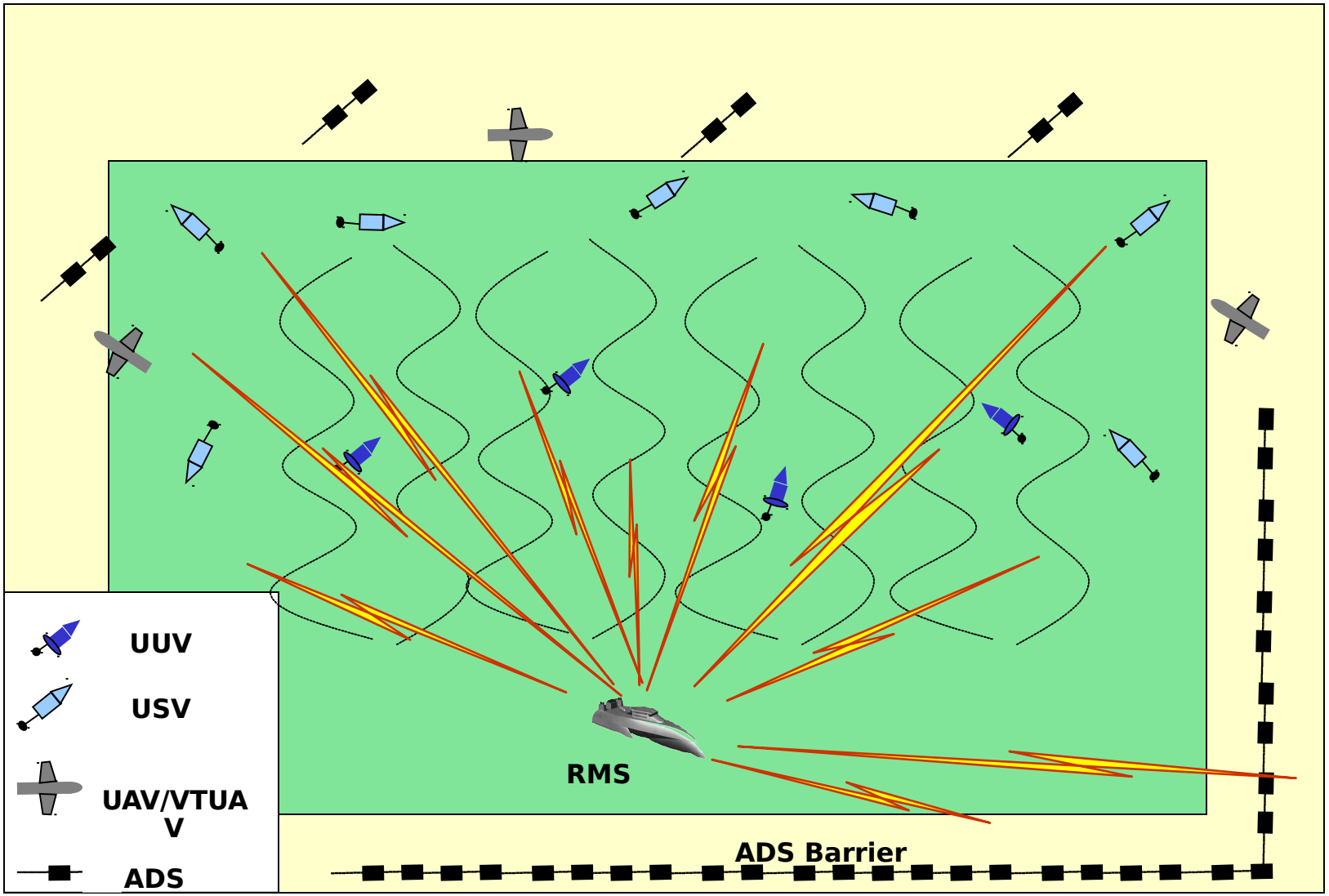
Meets Platfor

- **Deck Handling Cradle Piece and Launch & Recovery Ramp Cradle Piece Designed to Fit Platfor**
- **Can Accept any Offboard Systems (Manned & Unmanned) L&R Cradle/Cocoon Design as Long as it Meets Interface Spec**

Get Standardized: Common Vehicle C²

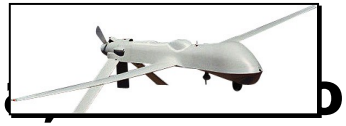


Get Many



Get Joint

- **Unmanned Systems that are part of Navy Mission Modules will be able to operate in conjunction with the Unmanned Air, Surface, Undersea, Ground Systems of all other services**



- **This requires:**
  - Joint Command and Control Architectures/Open Interface Standards
  - Common Data Links and Interface Standards
  - Common Control System (Non-Proprietary and Open Architecture)
  - Operation of LCS and its Modules as part of ForceNet

Result:

Fluid Generation and Transfer of Information throughout the Joint Force